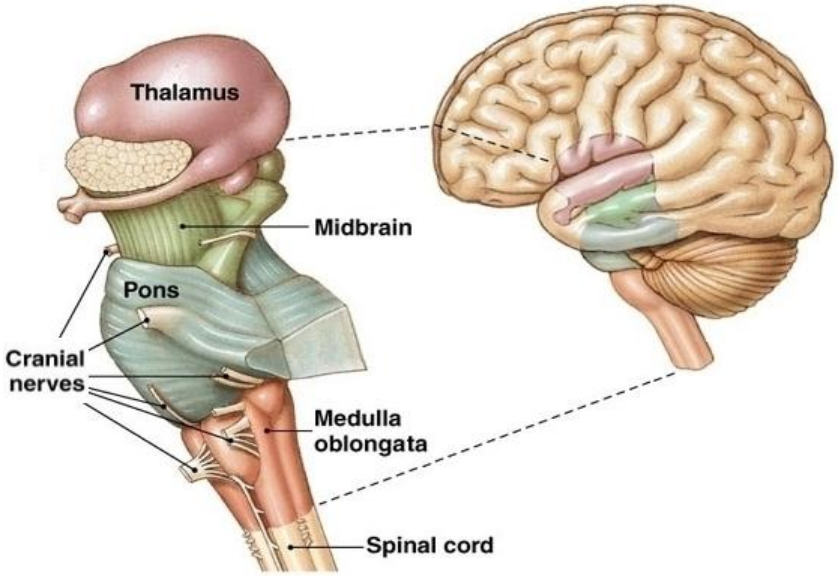
Assessment tools in Rehabilitation of Stroke Patients



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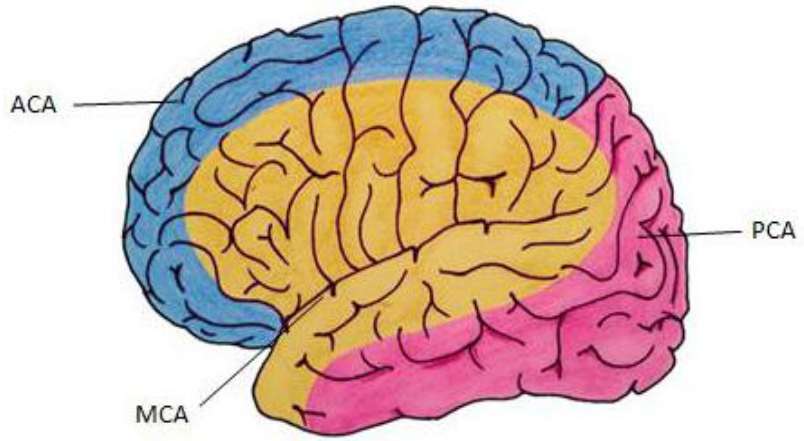
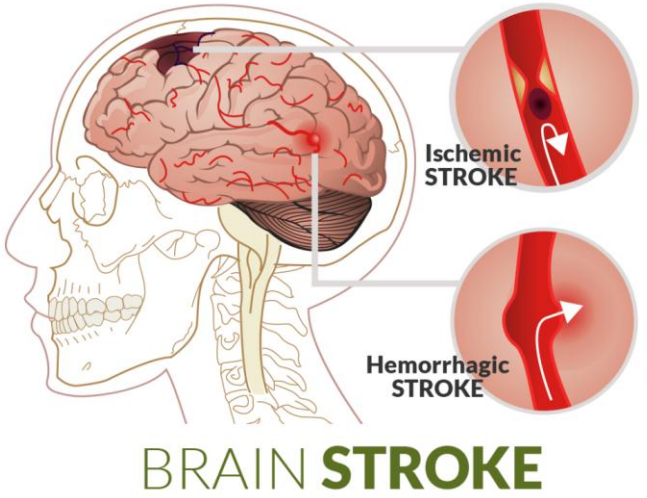
STROKE

The sudden death of brain cells due to lack of oxygen, caused by blockage of blood flow or rupture of an artery to the brain. Sudden loss of speech, weakness, or paralysis of one side of the body can be symptoms.





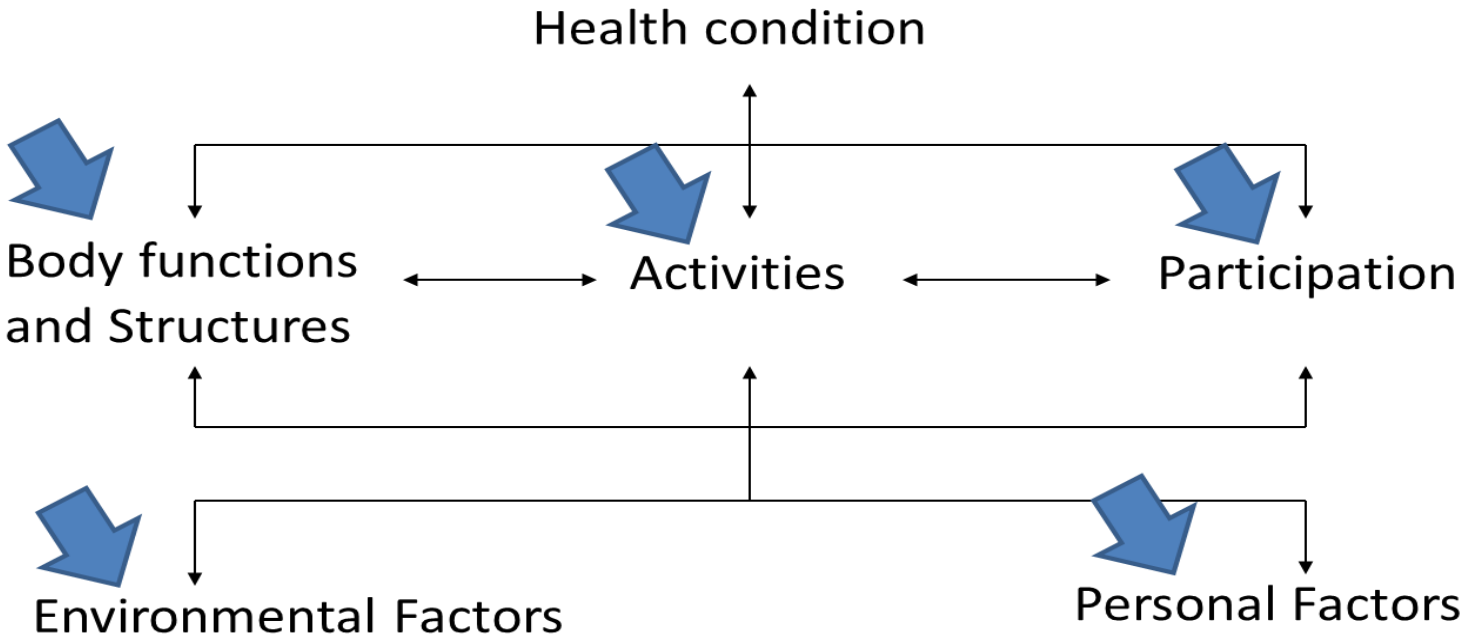
https://www.medicinenet.com/script/main/art.asp?articlekey=9791

Introduction

- Evaluations and assessments in stroke patients is important to establish the patient's difficulties according to ICF.
- Assessment should be focus on the patient's abilities and aspirations.
- Assessment and managements are cyclical processes, so that a physiatrist can evaluate the outcome of management.

Assessment based on ICF

The examiner needs to examine the patient's impairment, activities and activities limitations, participation and participation restrictions.



Assessments for stroke

1. Mental Status
2. Motor recovery
3. Muscle tone
4. Muscle strength
5. Sensory system
6. Co ordination
7. Neglect
8. Speech and Swallowing assessment
9. Balance ability
10. Walking ability
11. Activity of daily living

Impairment

Activity Limitation

Assessments for stroke

Assessment	Category	ICF category
Interview	Basic information	Impairment, Activity (limitation), Participation (restriction), Environmental factor, Personal factor
Glasgow coma scale (GCS)	Mental state	Impairment
Mini-mental state examination (MMS)		
Brunnstrom stage test (BST)	Motor Recovery	Impairment
Sensory test (superficial and deep sensory)	Sensory	Impairment
Finger nose test, heel shin test, rapid alternating movement	Coordination	Impairment
Behavioural Inattension test (BIT)	Neglect	Impairment
Speech and swallowing assessments	Speech and swallowing	Impairment
Berg balance scale (BBS)	Balance ability	Activity (limitation)
Functional reach test		
10 meter walk test	Walking ability	Activity (limitation)
Timed up and go test (TUG)		
Barthel index (BI)	ADL	Activity (limitation)
Functional independence measure (FIM)		

Union of Myanmar
Ministry of Health and Sports
Department of Medical Care
Yangon General Hospital
Department of Physical Medicine and Rehabilitation

	Date	Date	Date
GCS			
Fever			
Respiratory Rate			
Heart Rate			
Blood Pressure			
Intake and Output			
Pain			
Mini mental State			
Facial Expression			
Proper Positioning			

Muscle strength (Muscle power)

	Date	Date
Shoulder Flexor		
Shoulder Extensor		
Shoulder Abductor		
Shoulder Adductor		
Internal Rotator		
External Rotator		
Elbow Flexor		
Extensor		
Wrist Flexor		
Extensor		
Gripping		
Hip Flexor		
Extensor		
Abductor		
Adductor		
Knee Flexor		
Extensor		
Ankle Dorsiflexor		
Planterflexor		
Sensory Assessment		

Spasticity

	Date	Date	Date
Biceps Muscle			
Triceps Muscle			
Quadriceps Muscle			
Hamstrings Muscle			
Tibialis Anterior Muscle			
Gastrosoleus Muscle			
Achilles' tendon			
Clonus -Patellar -Ankle			
Tendon Jerk Bicep Tricep Supinator Knee Ankle			

Balance			
Trunk Control			
Berge Balance			
Measurement			
Muscle Wasting Tape measurement			
Coordination			
Finger-nose test			
Heel-shin test			
Rapid alternation movement			
Complications			
Subluxation			
Pressure Sore			

Brunnstrom Recovery Scale			
Finger			
Upper Limb			
Lower Limb			
Assessments			
	Week	week	week
Batheral Index			
FIM			
Gait			
6 mins walk test			
10 meter walk test			
Timed Up and Go (TUG) Test			
Berg Balance Scale			

Assessment of Persons with dysarthria

Contents	Date	Date	Date
Respiration			
Phonation			
Resonation			
Articulation			
Prosody			
Oral motor evaluation LIP TONGUE JAW			

Assessment of Aphasia

Sensory Aphasia

content	Date/result
Receptive Language Answering yes/no questions	
Following simple commands	
Following Complex command	
Pointing picture after heard its name	
Reading Comprehension	

Motor aphasia

content	Date /result
Automatic speech	
Speech imitation(Repeat after these words)	
Expressive language(Answering questions)	
Automatic speech	
Speech imitation	
Answering question	
Naming from pictures	
Writing skills	

Assessment of Persons with dysphagia

Content	Date/result
Alertness	
Follow Commands	
Attention	
Cooperativeness	
Sit in upright position	
Posture	
Head & Neck control	
Oral motor function	
Suctioning Required	
On Tracheotomy	
Current food intake,NG tube, GI tube, Oral feeding	
History of aspiration	
Water swallowing test p	
Modified Water swallowing test :	
Food test	
Indirect swallowing test	
Direct swallowing test	

1. Mental status

1. Glasgow Coma Scale (GCS)
2. Mini Mental State examination

Glasgow Coma Scale (GCS)

Best eye response (E)	Spontaneous – open with blinking at baseline	4
	Opens to verbal command, speech, or shout	3
	Opens to pain, not applied to face	2
	None	1
Best verbal response (V)	Oriented	5
	Confused conversation, but able to answer questions	4
	Inappropriate responses, words discernible	3
	Incomprehensible speech	2
	None	1
Best motor response (M)	Obeys commands for movement	6
	Purposeful movement to painful stimulus	5
	Withdraws from pain	4
	Abnormal (spastic) flexion, decorticate posture	3
	Extensor (rigid) response, decerebrate posture	2
	None	1

Glasgow Coma Scale (GCS)

The scale is composed of three tests: eye, verbal and motor responses. The three values separately as well as their sum are considered. The lowest possible GCS (the sum) is 3 (deep coma or death), while the highest is 15 (fully awake person).

*Teasdale G, Jennett B (1974). "Assessment of coma and impaired consciousness. A practical scale". Lancet. **2** (7872): 81–4. doi:10.1016/S0140-6736(74)91639-0. PMID 4136544.*

Mini Mental State (MMS)

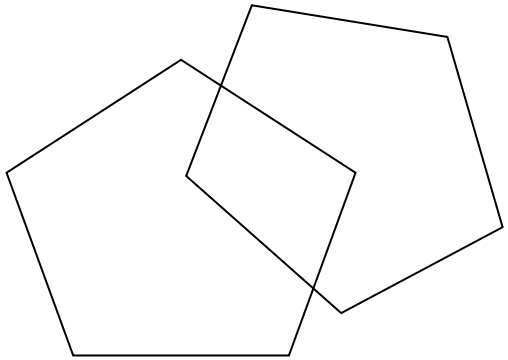
What does the MMSE test?

- The MMSE is a brief screening tool to provide a quantitative assessment of cognitive impairment and to record cognitive changes.

- The MMSE consists of 11 simple questions or tasks.
- Typically, these are grouped into 7 cognitive domains: orientation to time, orientation to place, registration of three words, attention and calculation, recall of three words, language and visual construction.
- Administration by a trained interviewer takes approximately 10 minutes.

Maximum Score	Score	Testing Item
Orientation		
5		What is the date? Year/Season/ Date/Day of the week/ Month
5		Where are we? State/ Country/ City/Hospital/Floor
Registration		
3		Name 3 objects (1 second to say each) and then ask the patient to repeat all 3 after you have said them. Give one point for each correct answer. Continue repeating all 3 objects until the patient learns all 3. Count trials and record.
Attention and Calculation		
5		Serial 7's. One point for each correct response. Stop after 5 answers. As an alternative, spell "world" backwards.
Recall		
3		Ask for the 3 objects named in Registration. Give 1 point for each correct answer.

Language		
2		Name a pencil and watch
1		Repeat the following “No ifs, ands, or buts”
3		Follow a 3-stage command. “Take paper in your right hand, fold it in half, and put it on the floor.”
1		Read and obey the following: CLOSE YOUR EYES
1		Write a sentence
1		Copy a design
30		



What are the key scores of the MMSE?

- The test yields a total score of 30 and provides a picture of the subject's present cognitive performance based on direct observation of test items/tasks.
- A score of 23 or less is the generally accepted cut-off point indicating the presence of cognitive impairment.
- Normal(24-30); mild impairment (18-24) and severe impairment(0-17)

What are the Advantages of the MMSE Test?

- Only requiring 10 minutes to complete, the MMSE is brief, inexpensive and simple to administer.
- Its widespread use and accepted cut-off scores increase its interpretability.

Assessment Tool	Purpose	Items and Administration	Additional Considerations
Mini-Mental State Examination (MMSE) Folstein et al., 1975	The MMSE is a screening tool for cognitive impairment	11 items relating to 6 cognitive domains (orientation – in time and space, registration, attention and calculation, recall, language and read and obey). Items are in the form of questions or tasks. Score Interpretation: Maximum score is 30; higher scores indicate greater cognitive functioning. Administration: Approximately 10 minutes to administer.	Relatively quick and simple tool that requires no additional equipment. Requires training for administration. Has been reported to have a low sensitivity, noted especially for those individuals with mild cognitive impairment as well and patients with stroke. Specialized Training: Not required

2. Motor Recovery

Brunnstrom staging

- Brunnstrom divides neurology recovery into 6 separate stages based on progression through the abnormal tone and spasticity.
- These 6 stages of recovery describe tone, reflex activity and volitional movement.

Brunnstrom staging

- ***Stage 1: Flaccid stage***

  The patient is completely flaccid, no voluntary movement, and patient is confined to bed.

- ***Stage 2: Spastic stage***

  Basic limb synergy develops, no voluntary movement, can be done as spasticity appears but is not marked.

- ***Stage 3: Synergy stage***

  Presence of stereotyped of motor synergy and abnormal mass movement.

  (This is the stage of maximal spasticity).

- ***Stage 4: Movement deviating from the Basic Synergies***

  Spasticity begins to decrease, begins to break stereotyped of motor synergy.

- ***Stage 5: Relative Independence of Basic Synergy***

  Selective movement of different joint is adequate.

- ***Stage 6: Near Normal Stage***

  There are isolated joint movements.

Stage 3: Synergy Stage

- Upper limbs

1. Flexor synergy (dominant)
2. Extensor synergy

- Lower limbs

1. Flexor synergy
2. Extensor synergy (dominant)

3. Motor Tone

Modified Ashworth Scale

- The scale is used to assign a subjective rating of the amount of resistance or tone perceived by the examiner as a limb is moved through its full range of motion.

- The modified Ashworth scale is routinely used to assess spasticity and indeed, is the current clinical standard.
- No specialized equipment is required.
- The original Ashworth scale consisted of 5 grades from 0 – 4.

Modified Ashworth Scale

Grade	Description
0	No increase in muscle tone.
1	Slight increase in muscle tone, manifested by a catch and release, or by minimal resistance at the end of range of motion when the affected part(s) is moved in flexion or extension.
1^{+}	Slight increase in muscle tone, manifested by a catch followed by minimal resistance throughout the remainder (less than half) of the range of movement (ROM).
2	More marked increase in muscle tone through most of ROM, but affected part(s) easily moved.
3	Considerable increase in muscle tone, passive movement difficult.
4	Affected part(s) rigid in flexion or extension.

Ref: Bohannon and Smith (1987)

Last Updated: June 19, 2013

Assessment Tool	Purpose	Items and Administration	Additional Considerations
Modified Ashworth Scale (MAS) Bohannon & Smith, 1987	The MAS is an **assessment** tool for spasticity.	Number of items is dependent on the number of joints that are being assessed. Joint assessment involves the movement of a joint from either maximal extension or flexion to the opposite position over a one second count. Score Interpretation: A score is reported for each joint assessed. Scores can range from 0-4 (0, 1, 1+, 2, 3, and 4); higher scores indicate greater rigidity or tone. Administration: Variable depending on the number of joints being assessed; a single joint is assessed over a one second	Quick assessment with no extra equipment required. The joint movement may cause some patient discomfort. Specialized Training: Required.

Deep tendon reflex

The patient's response to the tendon tap is.

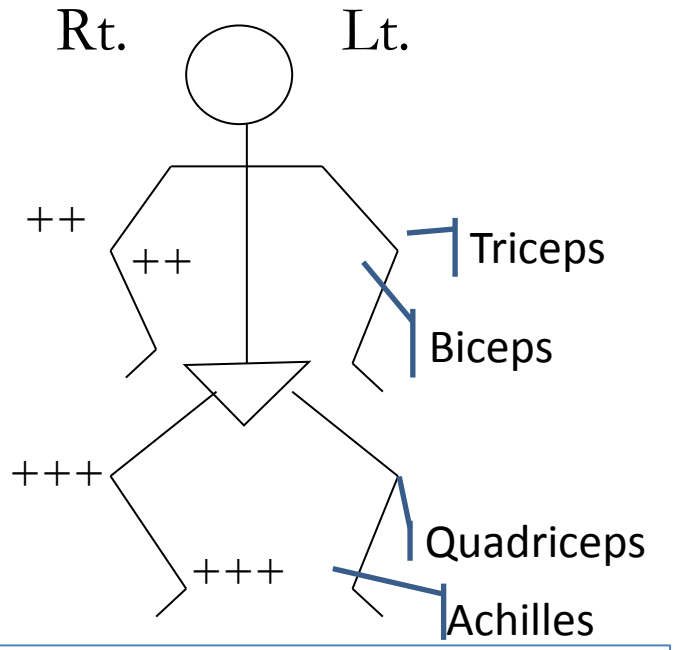
-, no response (absent)

±, minimal response (diminished)

+, normal

++, hyperactive response (brisk)

+++, hyperactive response (exaggerated)
(sometimes clonus)



Note: before concluding that reflexes are absent, have the patient re-enforce by performing an isometric contraction of other muscles (e.g. clench teeth or opposite limb for upper extremity reflexes or pull hooked fingers apart for lower extremity reflexes).

Clonus

Ankle
Support the knee in a partly flexed position.
With the patient relaxed, quickly dorsiflex the foot.
Observe for rhythmic oscillations.

Patella
Pushing the patella down towards the toes.

Clonus : Ankle (+), Patella (+)

4. Muscle strength

1. MRC grading
2. Manual Muscle Testing

Basic ideas

1) MMT is not appropriate for the evaluation of hemiplegia.

2) Dysfunction of multiple reflex mechanisms prevent highly selective motions.
3) Recovery of motor functions advances in a step-by- step manner.
4) Recovery from paralysis starts from proximal position.

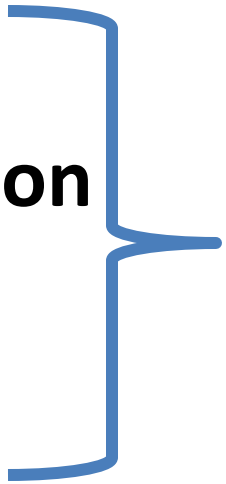
5) Synergic movement is a typical voluntary movement function that can occur in the early stage of recovery.

MRC grading

- Grade 0 : No contraction visible or palpable
- Grade 1 : Flicker of contraction visible or palpable, although no limb movement
- Grade 2 : Movement with gravity eliminated over almost full range of motion
- Grade 3 : Movement against gravity over almost full range of motion
- Grade 4 : Movement against moderate resistance over full range of motion
- Grade 5 : Normal power

5. Sensory system

- Light touch (cotton wool)
- Pain (pin prick)
- Temperature (Heat, cold)
- Joint position sense
- Point localization
- 2 point discrimination
- Stereognosis
- apraxia



Cortical sensation

6. Co ordination

1. Finger nose test
2. Heel shin test
3. Rapid alternative movement

7. Unilateral Spatial Neglect Assessment

- This is a condition that impairs discovering, responding to, and facing the direction to the stimulus opposite brain hemisphere lesion.
- In many cases, it appears as left unilateral spatial neglect caused mainly after damage to the right hemisphere.

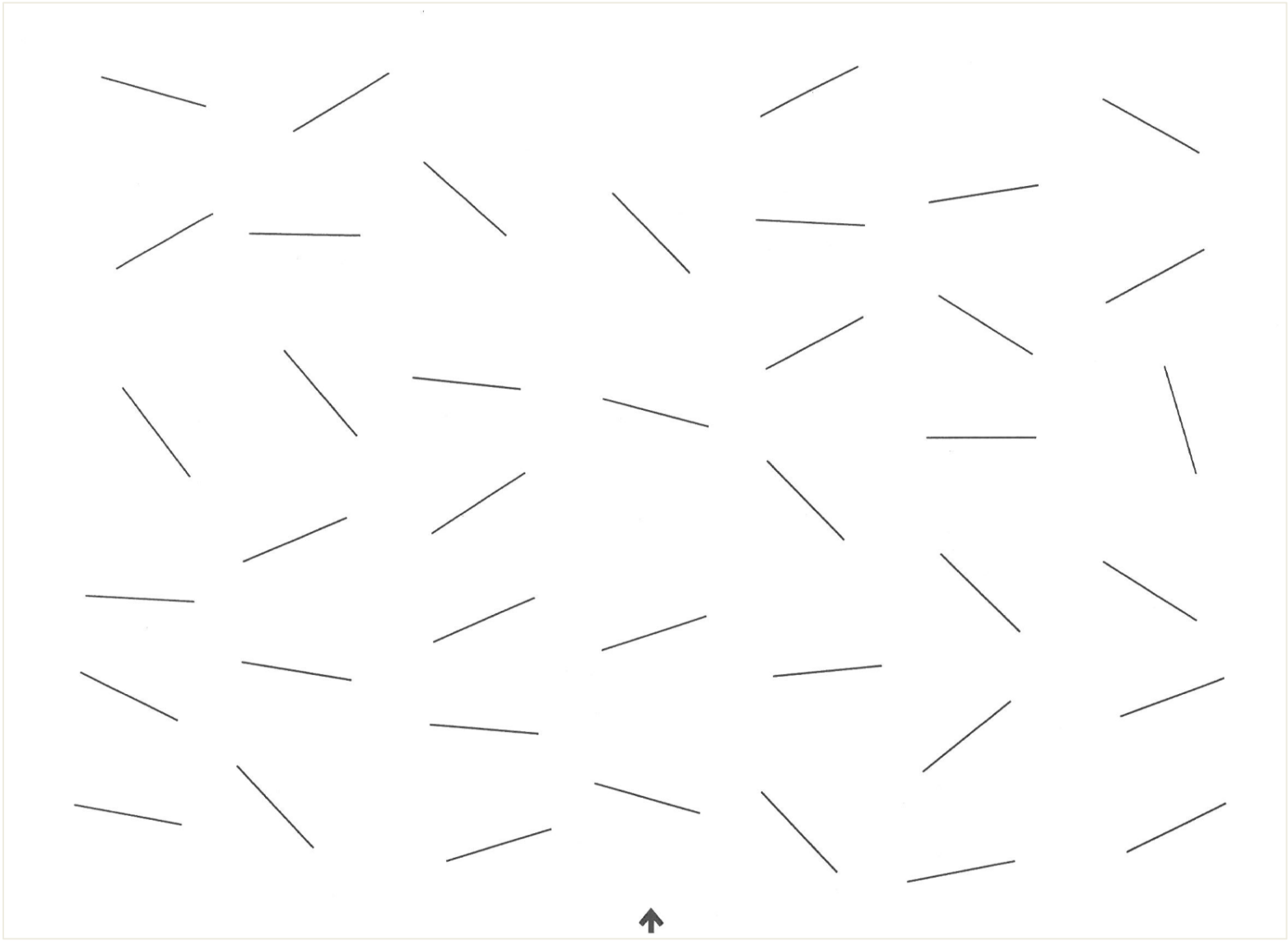
- This causes various problems, as the patient cannot respond in an appropriate way to space and objects opposite one side of the body.
- For example, the patient cannot finish a meal because he/she does not recognize food on the left side, forgets to put on the left brake of a wheelchair, collides with an object or a person on the left side when walking, and goes too far without noticing a corner or entrance.

These conditions can cause various risks and difficulties in training or daily life.

Behavioral inattention test ; BIT

- Conventional subtests
  - ① Line crossing
  - ② Letter cancellation
  - ③ Star cancellation
  - ④ Figure copying
  - ⑤ Line bisection
  - ⑥ Representation drawing

Line Cancellation Test



Letter Cancellation Test

A E I K N R U N P O E F B D H R S C O X R P G E A E I K N R U N P B

B D H E U W S T R F H E A F R T O L R J E M O E B D H E U W S T R T

N O S R V X T P E B D H P T S I J F L R F E N O O N O S R V X T P E

G L P T Y T R I B E D M R G K E D L P Q F Z R X G L P T Y T R I B S

H M E B G R D E I N R S V L E R F G O S E H C B R H M E B G R D E I

E & R

Star Cancellation Test

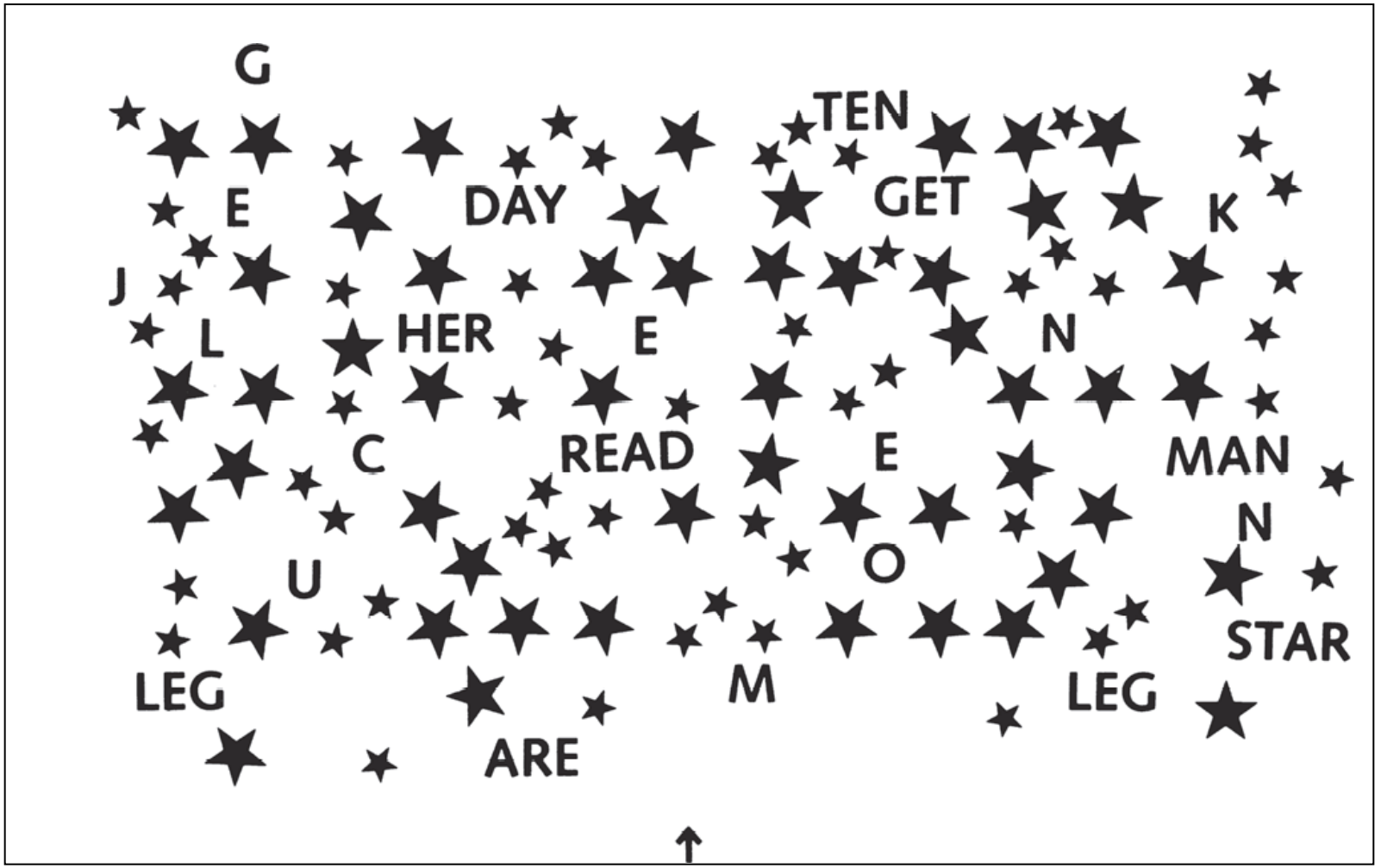
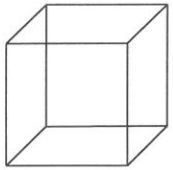
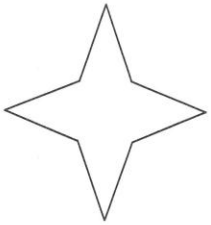


Figure copying

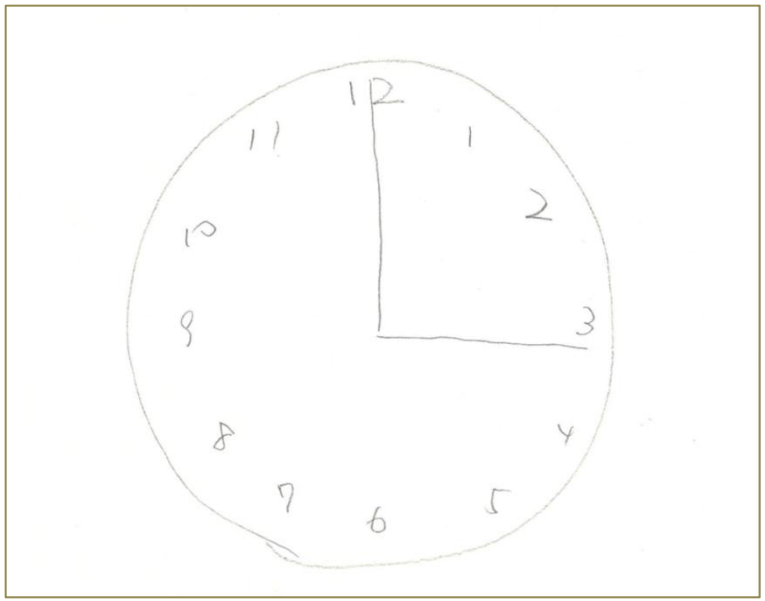


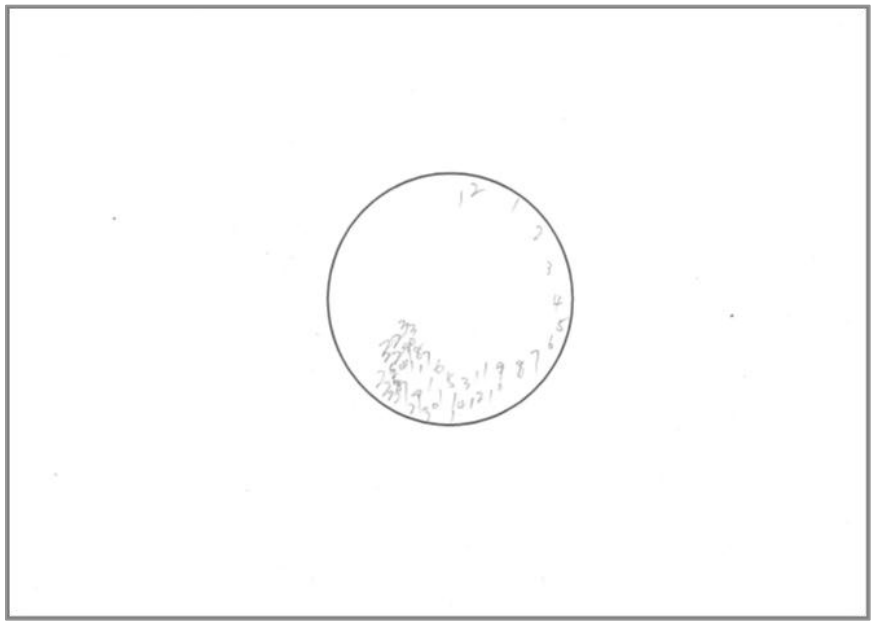


Representation Drawing

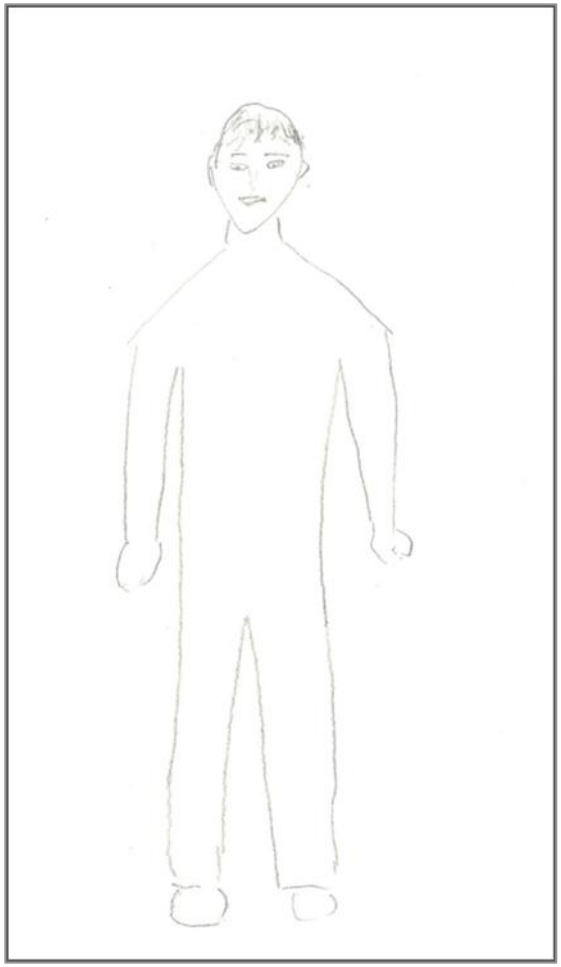
- Clock
- Person
- Butterfly

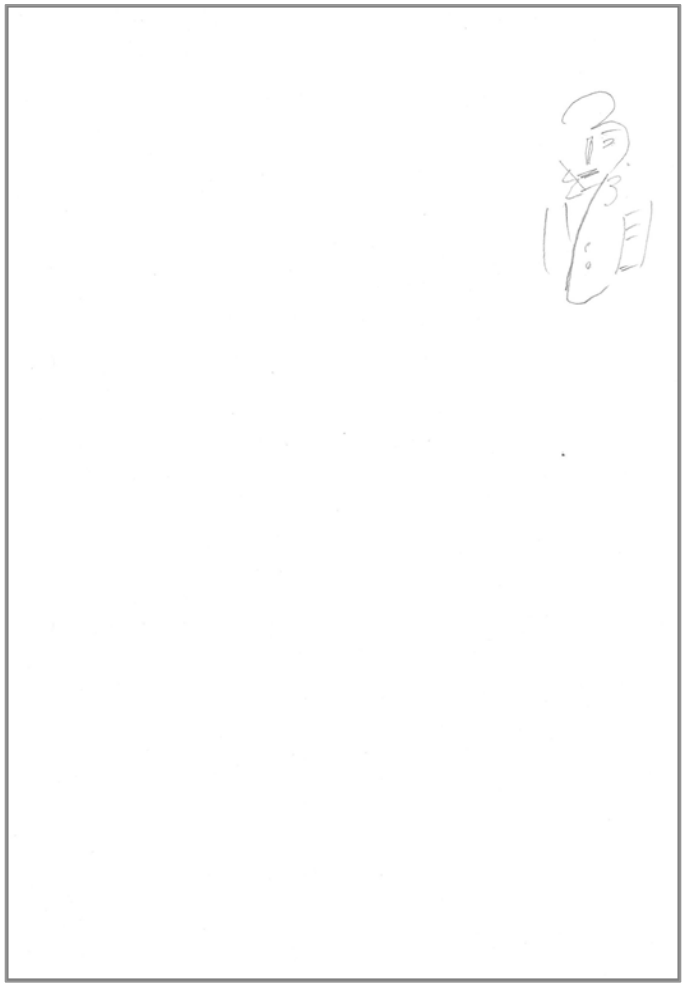
Clock





Person





8. Speech and Swallowing assessment

Assessment of dysarthria

1. Respiration – voluntary cough, throat clearing
2. Articulation – (A,E,I,O,U), Mar Mar , Lar Lar , Kha Kha
3. Oro-motor evaluation– Lip, Tongue, Jaw

Assessment of sensory aphasia

1. Receptive language (answering Yes, No questions)
2. Following simple commands
3. Following complex commands
4. Pointing picture after heard its name
5. Reading comprehension

Assessment of motor aphasia

1. Automatic speech imitation (repeat after these words)
2. Expressive language (answering questions)
3. Writing skills

Swallowing assessment

1. General status

- Alertness: good/ poor/ no response
- Follow commands: verbal/gesture/unable
- Attention: attentive/ distractible
- Cooperativeness: Yes/No

2. Physical status

- Sit in upright position: <60 / ~60 / >60
- Posture: good/poor
- Head & neck control: good/ poor

3. Respiratory status

- Suctioning required : Yes/No
- On tracheotomy: Yes/No

4. Feeding History

- Current food intake: NG tube/ GI tube/ Oral
- History of aspiration: Yes/ No

5. Oro-motor function

- Lips,Tongue,Cheeks,Jaws – Good/ Fair/Poor

6. Oral sensation

- Pressure, Temperature – Intact/ Impaired/ lost

7. Oral reflexes

- Gag, swallowing, cough – normal/abnormal

8. Swallowing test (Indirect test)part 1

❖ able to sit up at least in 60 upright position

	Yes	No
The patient is able to remain alert at least 15 mins		
Neglect and apraxia		
Voluntary cough/ Throat clearing		
Saliva / 1 ml water swallow		
Drooling/ voice change after swallow		

Total 5= continue with part 2

Total 1-4 = nothing by mouth

Part 2: Direct swallow test

	Subtest 1: -**Semisolid (Pudding)** -1/2 to 1/3 of teaspoon -If no aspiration, repeat up to 5 times	**Subtest 2:** - **Liquid** (3 ml water) - If no aspiration, continue with 5,10,20 ml of water - - 50 ml of water	**Subtest 3:** - **Solid** (a piece of dry bread) - If no aspiration, repeat up to 5 times - (should swallow within 10 sec)
Deglutition: 0-not possible, 1 – delay (3-10 sec), 2- successful	0 1 2	0 1 2	0 1 2
Cough (involuntary) 0- yes , 1 = No	0 1	0 1	0 1
Drooling 0- yes , 1 = No	0 1	0 1	0 1
Voice changed 0- yes , 1 = No	0 1	0 1	0 1

Total = 5
Go to subtest 2

Total = 5
Go to subtest 3

Total = 5
NORMAL

9. Balance activity

1. Berg Balance scale
2. Functional reach test

Berg Balance Scale

- The Berg Balance Scale (BBS) provides a quantitative assessment of balance in older adults.
- It measures different aspects of balance, both static and dynamic.
- The BBS is well suited to acute stroke rehabilitation, as the majority of patients do not obtain maximum scores on admission to rehabilitation.

- **Description:**

14-item scale designed to measure balance of the older adult in a clinical setting.

- **Equipment needed:**

Ruler, footstool or step, stopwatch or wristwatch, 15 ft walkway

- **Completion Time:**

15-20 minutes

- **Scoring:**

0-4. “0” indicates the lowest level of function and “4” the highest level of function. Total Score = 56

- It does so with minimal space and equipment requirements.
- No specialized training is required to administer the BBS.
- Interpretation:

  41-56 = low fall risk

  21-40 = medium fall risk

  0 –20 = high fall risk

Berg balance scale

1. Sitting unsupported
2. Change of position: sitting to standing
3. Change of position" standing to sitting
4. Transfers
5. Standing unsupported
6. Standing with eyes closed
7. Standing with feet together
8. Tandem standing
9. Standing on one leg
10. Turning trunk (feet fixed)
11. Retrieving objects from floor
12. Turning 360 degrees
13. Stool stepping
14. Reaching forward while standing

Berg Balance Scale

1. Sitting with back unsupported and feet on floor

( ) 4 able to sit safely and securely for 2 minutes
( ) 3 able to sit 2 minutes under supervision
( ) 2 able to sit 30 seconds
( ) 1 able to sit 10 seconds
( ) 0 unable to sit without support 10 seconds

2. Sitting to Standing

( ) 4 able to stand without using hands and stabilize independently
( ) 3 able to stand independently using hands
( ) 2 able to stand using hands after several tries
( ) 1 needs minimal aid to stand or stabilize
( ) 0 needs moderate or maximal assist to stand

3. Standing to sitting

( ) 4 sits safely with minimal use of hands
( ) 3 controls descent by using hands
( ) 2 uses back of legs against chair to control descent
( ) 1 sits independently but has uncontrolled descent
( ) 0 needs assist to sit

4. Transfers

( ) 4 able to transfer safely with minor use of hands
( ) 3 able to transfer safely definite need of hands
( ) 2 able to transfer with verbal cuing and/or supervision
( ) 1 needs one person to assist
( ) 0 needs two people to assist or supervise to be safe

5. Standing unsupported

( ) 4 able to stand safely for 2 minutes

( ) 3 able to stand 2 minutes with supervision

( ) 2 able to stand 30 seconds unsupported

( ) 1 needs several tries to stand 30 seconds unsupported

( ) 0 unable to stand 30 seconds unsupported

6. Standing unsupported with eyes closed

( ) 4 able to stand 10 seconds safely

( ) 3 able to stand 10 seconds with supervision

( ) 2 able to stand 3 seconds

( ) 1 unable to keep eyes closed 3 seconds but stays safely

( ) 0 needs help to keep from falling

7. Standing unsupported with feet together

( ) 4 able to place feet together independently and stand 1 minute safely

( ) 3 able to place feet together independently and stand 1 minute with supervision

( ) 2 able to place feet together independently but unable to hold for 30 seconds

( ) 1 needs help to attain position but able to stand 15 seconds feet together

( ) 0 needs help to attain position and unable to hold for 15 seconds

8. Standing unsupported one foot in front: tandem standing

( ) 4 able to place foot tandem independently and hold 30 seconds

( ) 3 able to place foot ahead independently and hold 30 seconds

( ) 2 able to take small step independently and hold 30 seconds

( ) 1 needs help to step but can hold 15 seconds

( ) 0 loses balance while stepping or standing

9. Standing on one leg

( ) 4 able to lift leg independently and hold > 10 seconds

( ) 3 able to lift leg independently and hold 5-10 seconds

( ) 2 able to lift leg independently and hold > 3 seconds

( ) 1 tries to lift leg unable to hold 3 seconds but remains standing independently.

( ) 0 unable to try of needs assist to prevent fall

10. Turning trunk (feet fixed)

( ) 4 looks behind from both sides and weight shifts well

( ) 3 looks behind one side only other side shows less weight shift

( ) 2 turns sideways only but maintains balance

( ) 1 needs supervision when turning

( ) 0 needs assist to keep from losing balance or falling

11. Pick up object from the floor from a standing position

( ) 4 able to pick up slipper safely and easily

( ) 3 able to pick up slipper but needs supervision

( ) 2 unable to pick up but reaches 2-5 cm(1-2 inches) from slipper and keeps balance independently

( ) 1 unable to pick up and needs supervision while trying

( ) 0 unable to try/needs assist to keep from losing balance or falling

12. Turn 360 degrees

( ) 4 able to turn 360 degrees safely in 4 seconds or less

( ) 3 able to turn 360 degrees safely one side only 4 seconds or less

( ) 2 able to turn 360 degrees safely but slowly

( ) 1 needs close supervision or verbal cuing

( ) 0 needs assistance while turning

13. Place alternate foot on stool while standing unsupported

( ) 4 able to stand independently and safely and complete 8 steps in 20 seconds

( ) 3 able to stand independently and complete 8 steps in > 20 seconds

( ) 2 able to complete 4 steps without aid with supervision

( ) 1 able to complete > 2 steps needs minimal assist

( ) 0 needs assistance to keep from falling/unable to try

14. Reaching forward while standing

( ) 4 can reach forward confidently 25 cm (10 inches)

( ) 3 can reach forward 12 cm (5 inches)

( ) 2 can reach forward 5 cm (2 inches)

( ) 1 reaches forward but needs supervision

( ) 0 loses balance while trying/requires external support

( ) Total score (Maximum = 56)

Assessment Tool	Purpose	Items and Administration	Additional Considerations
Berg Balance Scale (BBS) Berg et al., 1989	The BBS is an assessment tool for balance in older adults and Neurological disorder.	14-items in which patients are asked to maintain positions or complete movement tasks of varying levels of difficulty. All items are common to everyday life. Score Interpretation: Total scores range from 0-56, with scores of less than 45 generally accepted as being indicative of balance impairment. Administration: Observation; approx. 10- 15 minutes to complete.	The BBS requires little equipment or space to complete and has demonstrated high levels of reliability even when administered by an untrained assessor (Berg et al. 1995). Sensitivity may be reduced among severely affected patients as the BBS includes only one item relating to balance in a seated position (Mao et al. 2002). Specialized Training: Not required.

Functional reach test

- The patient is instructed to next to, but not touching, a wall and position the arm that is closer to the wall at 90 degrees of shoulder flexion with a closed fist.
- The assessor records the starting position at the 3rd metacarpal head on the yardstick.
- Instruct the patient to “Reach as far as you can forward without taking a step.”

- The location of the 3rd metacarpal is recorded.

- Scores are determined by assessing the difference between the start and end position is the reach distance, usually measured in inches.

- 3 trials are done and the average of the last two is noted.

- Normal value = 20 – 25 cm (10 inches)

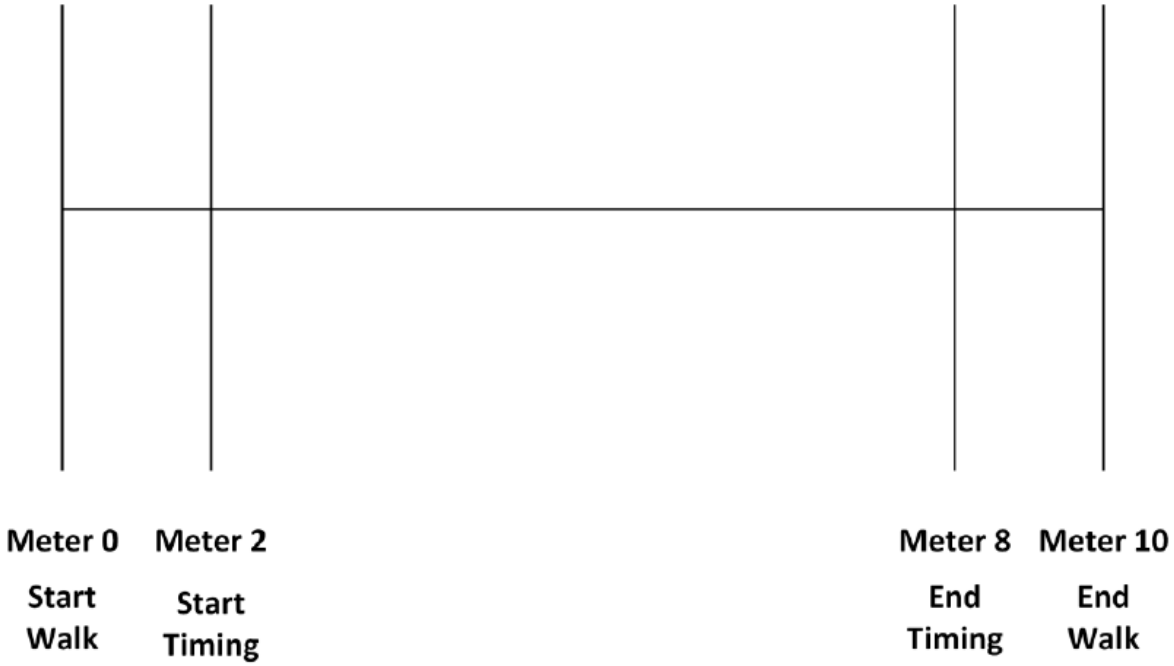
10. Walking ability

1. 10 meter walk test
2. Timed up and go test

10 meter walk test

Set-up:

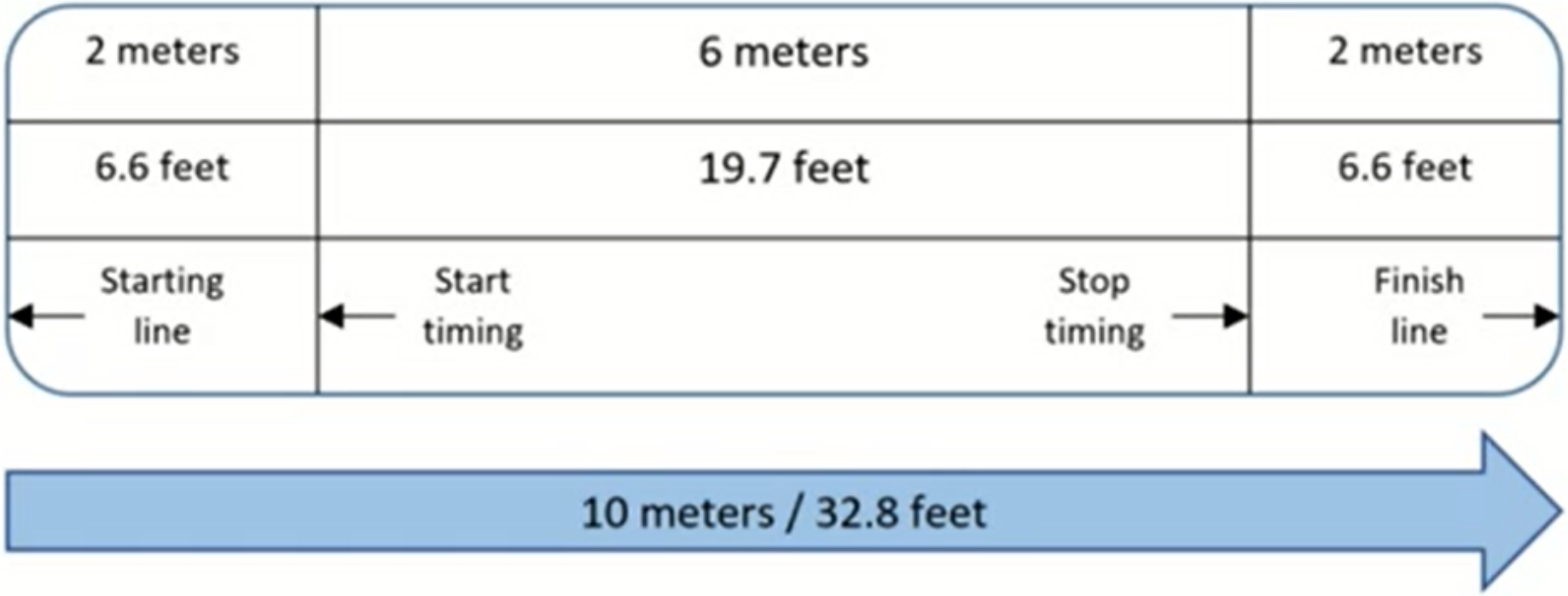
- measure and mark a 10-meter walkway
- add a mark at 2-meters
- add a mark at 8-meters



Patient Instructions

- Normal comfortable speed: *"I will say ready, set, go. When I say go, walk at your normal comfortable speed until I say stop"*
- Maximum speed trials: *"I will say ready, set, go. When I say go, walk as fast as you safely can until I say stop"*

- Start the timing when the patient reaches 2 m distance and stop the timer when the patient reaches 8 m distance.



Gait Speed = 6 meters / time to complete

6 meters / 9 seconds =

0.67 meters per second (m/s)

10 Meter Walk Testing Form

Name:_____

Assistive Device and/or Bracing Used:_____

Date:_____

Seconds to ambulate 10 meters (only the middle 6 meters are timed)

Self-Selected Velocity: Trial 1_____sec.____ Fast Velocity: Trial 1_____sec.____

Self-Selected Velocity: Trial 2_____sec.___ Fast Velocity: Trial 2_____sec.___

Self-Selected Velocity: Trial 3_____sec.____ Fast Velocity: Trial 3_____sec.____

Self-Selected Velocity: Average time___sec.___ Fast Velocity: Average time___sec.___

Actual velocity: Divide 6 by the average seconds

Average Self-Selected Velocity:_____m/s

Average Fast-Velocity:_____m/s

Timed Up and Go Test

General Information

- The patient should sit on a standard armchair, placing his/her back against the chair and resting his/her arms chair's arms. Any assistive device used for walking should be nearby.
- Regular footwear and customary walking aids should be used.
- The patient should walk to a line that is 3 meters (10 feet) away, turn around at the line, walk back to the chair, and sit down.

- The test ends when the patient's buttocks touch the seat.
- Patients should be instructed to use a comfortable and safe walking speed.
- A stopwatch should be used to time the test (in seconds).

Set-up:

- Measure and mark a 3 meter (10 feet) walkway
- Place a standard height chair (seat height 46cm, arm height 67cm) at the beginning of the walkway

Patient Instructions

- Instruct the patient to sit on the chair and place his/her back against the chair and rest his/her arms chair's arms.
- The upper extremities should not be on the assistive device (if used for walking), but it should be nearby.
- Demonstrate the test to the patient.
- When the patient is ready, say "Go"
- The stopwatch should start when you say go, and should be stopped with the patient's buttocks touch the seat.

Assessment Tool	Purpose	Items and Administration	Additional Considerations
Timed “Up and Go” Test (TUG) Podsiadlo and Richardson, 1991	The TUG is a screening tool for basic mobility and balance.	Individuals are asked to stand from a seated position, walk 3 meters (using an aid if required), turn, walk back to the chair, and reseat themselves. Score Interpretation: The total time to complete the test is recoded with shorter intervals indicating better mobility and balance. Administration: Observation; approx. 3 minutes to complete.	The TUG addresses relatively few aspects of balance and yields a narrower assessment than more comprehensive balance measures, such as the Berg Balance Scale (Whitney et al. 1998). Specialized Training: Not required

Interpretation:

≤ 10 seconds = normal

≤ 20 seconds = good mobility, can go out alone, mobile without gait aid

≤ 30 seconds = problems, cannot go outside alone, requires gait aid

* A score of ≥ 14 seconds has been shown to indicate high risk of falls.

11. Activities of daily living (ADL)

1. Barthel index
2. Functional Independence Measure (FIM)

Barthel index

- **FEEDING**
- 0 = unable, 5 = needs help cutting, spreading butter, etc., or requires modified diet
- 10 = independent
- **BATHING**
- 0 = dependent, 5 = independent (or in shower)
- **GROOMING**
- 0 = needs to help with personal care
- 5 = independent face/hair/teeth/shaving (implements provided)
- **DRESSING**
- 0 = dependent, 5 = needs help but can do about half unaided
- 10 = independent (including buttons, zips, laces, etc.)
- **BOWELS**
- 0 = incontinent (or needs to be given enemas), 5 = occasional accident
- 10 = continent
- **BLADDER**
- 0 = incontinent, or catheterized and unable to manage alone
- 5 = occasional accident, 10 = continent

TOILET USE

0 = dependent, 5 = needs some help, but can do something alone

10 = independent (on and off, dressing, wiping) _____

TRANSFERS (BED TO CHAIR AND BACK)

0 = unable, no sitting balance, 5 = major help (one or two people, physical), can sit

10 = minor help (verbal or physical), 15 = independent

_____

MOBILITY (ON LEVEL SURFACES)

0 = immobile or < 50 yards

5 = wheelchair independent, including corners, > 50 yards

10 = walks with help of one person (verbal or physical) > 50 yards

15 = independent (but may use any aid; for example, stick) > 50 yards

_____

STAIRS

0 = unable, 5 = needs help (verbal, physical, carrying aid), 10 = independent

_____

TOTAL (0–100): _____

Barthel Index (BI)

Purpose of the measure

This index measures the extent to which somebody can function independently and has mobility in their activities of daily living (ADL) i.e. feeding, bathing, grooming, dressing, bowel control, bladder control, toileting, chair transfer, ambulation and stair climbing.

The index also indicates the need for assistance in care. The Barthel Index (BI) is a widely used measure of functional disability. The index was developed for use in rehabilitation patients with stroke and other neuromuscular or musculoskeletal disorders, but may also be used for oncology patients.

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Evidence reviewed as of before 07-10-2015

Assessment Tool	Purpose	Items and Administration	Additional Considerations
Barthel Index of Activities of Daily Living (BI) Mahoney et al., 1965	The BI is an assessment tool for evaluating independence in self-care activities. .	The BI consists of 10 common ADLs, 8 related to personal care and 2 related to mobility. Score Interpretation: The index yields a total score out of 100 with higher scores indicating greater functional independence. Administration: Self-Report (less than 5 minutes) or direct observation (up to 20 minutes).	Widespread familiarity of the BI contributes to its interpretability. The BI is relatively insensitive and a lack of comprehensiveness may result in problems with ceiling and floor effects (Duncan et al. 1997). Specialized Training: Not required.

Functional independence measure (FIM)

	Modified dependence	**Completely dependence**
7 Complete independence,	5 Supervision	2 Maximal assistance
6 Modified independence	4 Minimal assistance	1 Total assistance
	3 Moderate assistance	

FIM Score

Self-care		
1. Eating		
2. Grooming		
3. Bathing/showering		
4. Dressing upper body		
5. Dressing lower body		
6. Toileting		
Sphincters control		
7. Bladder management		
8. Bowel management		

Transfers		
9. Bed/chair/wheelchair		
10. Toilet		
11. Bathtub/shower		
Locomotion		
12. Walking/wheelchair		
13. Stairs		

Communication		
14. Expression		
15. Comprehension		
Social Cognition		
16. Social interaction		
17. Problem solving		
18. Memory		

Total score = 126

Assessment Tool	Purpose	Items and Administration	Additional Considerations
Functional Independence Measure (FIM) Keith et al., 1987	The FIM is an assessment tool for physical and cognitive disability and is intended to measure burden of care.	18-items evaluating 6 areas of function: self-care, sphincter control, mobility, locomotion, communication and social cognition. Score Interpretation: Maximum score is 126, with higher scores indicating greater levels of functional independence. Scores can also be calculated for motor and cognitive subscales. Administration: Observation; approx. 30 minutes to complete.	The FIM has been well-studied for its validity and reliability within stroke populations; however, it has been suggested that reliability is dependent on the individual administering the assessment (Salter et al. 2012). Specialized Training: Required.

KEY POINTS

- The primary goal of rehabilitation is to prevent complications, minimize impairments, and maximize function.
- Secondary prevention is fundamental to preventing stroke recurrence
- Early assessment and intervention is critical to optimize rehabilitation.
- Standardized evaluations and valid assessment tools are essential to the development of a comprehensive treatment plan.

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THANK YOU